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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,438	07/02/2003	Teck H. Hu	2100.000800	6519

46290 7590 10/29/2008

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EXAMINER	
HEIBER, SHANTELL LAKETA	
ART UNIT	PAPER NUMBER
2617	
MAIL DATE	DELIVERY MODE
10/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/612,438	HU ET AL.	
	Examiner	Art Unit	
	SHANTELL HEIBER	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *7/2/03* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The applicant argues that ***"Although Hill iterates candidate packets and power levels, this does not equate to iterating channelization code numbers and power levels for a given set of packets. Applicants do not vary the set of candidate packets. Hill is completely silent about assigning channelization codes. This is the case for several reasons."*** Applicant's arguments above with respect to claims 1, 10, 16 and 28 have been considered but are moot in view of the new ground(s) of rejection.

2. The applicant argues that ***"First, the scheduler of Hill operates at the radio network controller level. Channelization codes are not assigned at this level, but rather, channelization codes are assigned at the base station level. Hence, for this reason alone, Hill cannot iteratively assign numbers of channelization codes. The candidate packets and power iterations of Hill have nothing to do with channelization codes. Any iterations are completed prior to the assigning of channelization codes."*** The examiner disagrees. Hill fails to specifically mention channelization codes throughout the body of the detailed description of inventor's preferred embodiment (Cols. 3-7), however, Hill does disclose in detail CDMA communication systems. According to Col. 1, line 57-Col. 2, line 15 and Col. 2, lines 34-54, in a CDMA system, codes are allocated to remote terminals to minimize the interference caused between remote terminals. Hill further mentions the importance for optimal utilization of resources to schedule the order and time for transmission of the

individual packets. Most packet based systems contain schedulers which control when the individual data packets are transmitted and therefore share the available resource (for example, power and codes in a CDMA system). Hill's invention covers the need for a scheduler to optimize for CDMA systems where codes and power must be shared. Therefore, according to Hill, the candidate packets and power iterations *have* to do with channelization codes. Furthermore, the examiner is unsure where in Hill states *"the scheduler of Hill operates at the radio network controller level. Channelization codes are not assigned at this level, but rather, channelization codes are assigned at the base station level. Hence, for this reason alone, Hill cannot iteratively assign numbers of channelization codes. The candidate packets and power iterations of Hill have nothing to do with channelization codes. Any iterations are completed prior to the assigning of channelization codes."*

3. The applicant argues that ***"With respect to the dependent claims, the specific features set forth for the iterative technique and the use of optimization parameters, constraints, and cost functions are neither taught nor suggested by Tiedemann. Again, the cited passages only relate to the power levels over time, not to the assignments for a current transmission. The Office Action fails to demonstrate by specific reference to the prior art how the use of optimization parameters, constraints, and/or a cost function may be used in an iterative technique to optimize channel capacity for a current transmission."***

4. Tiedemann discloses cost is associated with each classification: CBR being the most expensive, VBR the next expensive and ABR the least expensive. Based on this

priority list the portions of available power are assigned accordingly; [0005]-[0007]. Tiedemann discloses a method and apparatus for maximizing the use of available capacity in a communication system. Tiedemann further discloses a graphical representation of the traffic in the forward link (for a current transmission) of a cellular communication system where the CBR traffic streams 14a-c and VBR traffic streams 14d-f are transmitted simultaneously on a common channel within the time frames 18a-f. The values of power allocated and number of channelization codes are determined based upon the first transmit power needed for CBR and VBR traffic streams where as both CBR and VBR traffic (each traffic stream transmitted is assigned to a code channel) take priority over ABR traffic. Once the base station loads the forward link with CBR and VBR traffic in every time frame, it determines which time frames have additional capacity available for transmitting ABR traffic by comparing the power needed for transmission of the CBR and VBR during each such frame with the maximum output power value. The ABR traffic streams use all of the remaining available base station output power in order to take advantage of the available transmit power which would otherwise remain unused thereby, maximizing the use of available capacity in a communication system. Therefore, Tiedemann teaches a scheduling method for optimizing the capacity of a channel for communicating. Tiedemann discloses an iterative technique (scheduling method) as described in paragraphs [0031]-[0035] and referencing figures 1 and 2 where this method or technique is used repeatedly during communication. Further, Tiedemann discloses scheduling policies, rules for determining which of a plurality of signals waiting to be transmitted are actually inserted into a frame,

implemented within the method for determining how best to schedule or transmit the ABR traffic streams in order to take advantage of the available forward link transmit power that would otherwise remain unused. Also, see paragraphs [0041], [0080] and [0081]. Therefore, Tiedemann discloses the use of optimization parameters, constraints, and/or a cost function may be used in an iterative technique to optimize channel capacity for a current transmission.

5.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 611, 14, 16-17, 21-24, 26, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (Hill), U.S. Patent No. 6,775,256 in view of Seo et al. (Seo), U.S. Publication No. 2003/0039217.

Regarding Claims 1, 10, 16 and 28, Hill discloses a method of communication, comprising: assigning at least one channelization code to each of a plurality of data packets available for a current transmission; and allocating available transmission power to the channelization codes based on a plurality of channel quality metrics, at least a subset of the channelization codes being assigned respective portions of the

available power, wherein: the assigning and allocating further comprise evaluating a number representing how many channelization codes are to be assigned to each of the packets and evaluating the portion of the allocated transmission power to be assigned to each data packet using an iterative procedure that adjusts the values for the portions of the allocated transmission power for at least one iteration responsive to the channel quality metrics and the values for the portions of the allocated transmission power determined during at least one prior iteration to optimize a capacity of a channel for communicating the data packets during the current transmission. **(The scheduler 231 selects a candidate set of packets. The transmit powers required to transmit the packets is calculated based on the packets in the candidate set. Based on the calculation of the transmit powers, the candidate set is modified. If it has not been determined that a final candidate set has been determined then a new calculation of transmit powers is performed based on the modified candidate set. This iteration continues until a final candidate set has been determined; Col. 4, lines 46-57; Col. 5, lines 43-47 and Col. 6, lines 1-55)**

Hill fails to disclose an iterative procedure that adjusts the values for the portions of the *number of channelization codes* for at least one iteration responsive to the channel quality metrics and the *number of channelization codes* determined during at least one prior iteration.

In a similar field of endeavor, Seo discloses an apparatus and method for transmitting/receiving uplink transmission power offset and HS-DSCH power level in a communication system employing HSDPA. Seo further discloses an iterative

procedure that adjusts the values for the portions of the *number of channelization codes* for at least one iteration responsive to the channel quality metrics and the *number of channelization codes* determined during at least one prior iteration. **[0153]-[[0156]**

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to maximize the capacity of the system (Hill) further employing high-speed packet data (Seo) for yielding predictable results.

Regarding Claims 2, 17 and 18, Hill and Seo disclose further comprising: determining the portions of the available power to be assigned based on the channel quality metrics and a first optimization parameter**;** determining the values of the number of channelization codes assigned to the data packets based on the determined portions of the available power and a second optimization parameter**;** and repeating over a plurality of iterations the determining of the portions of the available power and the determining of the values of the number of channelization codes. **(Hill-Col. 6, lines 1-26)**

Regarding Claims 3 and 29, Hill and Seo disclose further comprising: determining the number of channelization codes assigned to each data packet based on a size of the data packet and one of the channel quality estimates associated with the data packet; determining the portions of the available power to be assigned to each of the channelization codes based on a first optimization parameter; and repeating over a plurality of iterations the determining of the number of channelization codes and the determining of the portions of the available power. **(Hill-Col. 6, lines 1-26)**

Regarding Claims 4 and 19, Hill and Seo disclose further comprising: terminating the repeating responsive to the assigned channelization codes in a first iteration being the same as the assigned channelization codes in a second later iteration; and truncating the subset of assigned channelization codes based on a maximum number of allowable channelization codes. **(Hill-Col. 6, lines 27-55)**

Regarding Claims 6 and 21, Hill and Seo disclose further comprising prioritizing the plurality of data packets. **(Hill-Col. 5, lines 1-16)**

Regarding Claims 7 and 22, Hill and Seo disclose wherein prioritizing the plurality of data packets further comprises: identifying a plurality of quality of service classes; assigning a predetermined amount of the available power to each of the quality of service classes; and assigning the channelization codes and the portions of the available power based on the predetermined amounts for each quality of service classes. **(Hill-The candidate set selection is based upon the size of queued packets, Quality of Service information and priority; Col. 5, lines 1-16)**

Regarding Claims 8 and 23, Hill and Seo disclose wherein prioritizing the plurality of data packets further comprises: identifying a plurality of quality of service classes; assigning the channelization codes and the portions of the available power for a first class of the quality of service classes; determining a remaining amount of the available power after the assigning for the first class; and assigning the channelization codes and the portions of the available power for a second class of the quality of service classes based on the remaining amount of available power. **(Hill-A candidate set is continuously modified through iteration until a final candidate set is**

identified. During the modification, packets may be added and/or removed, therefore a new set is constantly being identified based on new calculations reflecting the modifications. Also see rejection for Claims 7 and 22)

Regarding Claims 9 and 24, Hill and Seo disclose wherein prioritizing the plurality of data packets further comprises: identifying a plurality of quality of service classes; combining all data packets in the plurality of quality of service classes; sorting the combined users based on a fairness algorithm; and assigning the channelization codes and the portions of the available power based on the sorting**. (See rejections for Claims 7, 22, 8 and 23)**

Regarding Claim 11, Hill and Seo disclose further comprising initiating a communication link over a channel, the communication link being assigned to a quality of service class having a predetermined transmit power assignment and the power fraction is based on a portion of the predetermined transmit power**. (Hill-Col. 5, lines 1-16)**

Regarding Claims 14 and 26, Hill and Seo disclose wherein the first constraint and first optimization parameter are associated with the power available for communicating, and the channelization codes and power fractions associated with the signal are assigned by determining the portions of the available power to be assigned based on the first optimization parameter**. (Hill-Col. 6, lines 1-41)**

6. Claims 5, 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill and Seo in view of Gollamudi et al. (Gollamudi), U.S. Publication No. 2003/0123477.

7. **Regarding Claims 5, 12 and 20, Hill and Seo disclose** the method and system wherein the channelization codes and the power fractions associated with the signal are assigned based on the channel quality estimate to optimize a channel as described above.

8. Hill and Seo fail to disclose wherein optimizing the capacity further comprises optimizing a Shannon capacity of the channel for communicating the data packets.

9. In a similar field of endeavor, Gollamudi discloses an adaptive quality control loop for link rate adaptation in data packet communications. Gollamudi further discloses wherein optimizing the capacity further comprises optimizing a Shannon capacity of the channel for communicating the data packets. **[0003]-[0005]**

10. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to estimate channel conditions using a channel quality metric (Gollamudi) for maximizing the capacity of the system (Hill).

6. Claims 13, 15, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill and Seo in view of Tiedemann, Jr. et al. (Tiedemann), U.S. Publication No. 2002/00304170..

Regarding Claims 13, 15, 25 and 27, Hill and Seo disclose the method and system wherein the channelization codes and power fractions associated with the signal are assigned by at least one of the channelization codes and the portions of power available for communicating based on the first optimization parameter as described above.

Hill and Seo fail to disclose further comprising: generating a cost function using a channel capacity equation having a first constraint, the cost function including a first optimization parameter associated with the first constraint; and determining a value for the first optimization parameter based on a first order derivative of the cost function.

In a similar field of endeavor, Tiedemann discloses a method and apparatus for maximizing the use of available capacity in a communication system. Tiedemann further discloses further comprising: generating a cost function using a channel capacity equation having a first constraint, the cost function including a first optimization parameter associated with the first constraint; and determining a value for the first optimization parameter based on a first order derivative of the cost function. According to Tiedemann **[0005]-[0007]** cost is associated with each classification: CBR being the most expensive, VBR the next expensive and ABR the least expensive. Based on this priority list the portions of available power are assigned accordingly.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to determine the amount of power required for transmitting each code channel based upon priority so as to not exceed the total amount of power that the amplifier can provide without undesirable distortion **[Tiedemann-0007]**.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lundby et al., U.S. Patent No. 7,068,683 discloses a method and apparatus for high rate packet data and low delay data transmissions.

Hsu, U.S. Publication No. 2004/0090938 discloses a method of optimizing radiation pattern of smart antenna.

Ketchum, U.S. Patent No. 6,731,668 discloses a method and system for increased bandwidth efficiency multiple input-multiple output channels.

Bombay et al., U.S. Patent No. 6,999,517 discloses a method and apparatus for transmission of data on multiple propagation modes with far-end cross-talk cancellation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shantell Heiber whose telephone number is (571)272-0886. The examiner can normally be reached on Monday-Friday 9:00am-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on 571-272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. H./
Examiner, Art Unit 2617
October 24, 2008

/Lester Kincaid/
Supervisory Patent Examiner, Art Unit 2617